

# Don't Always Blame the Extruder

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Over the years I have seen many extrusion problems solved without any changes to the extrusion equipment or control settings. Consider, for example, two polymerization plants producing polystyrene beads by the suspension process, followed by extrusion into pellets. The old obsolete smaller plant for many years had been achieving extrusion rates considered normal for the industry.

However, the newly built modern plant was only getting about 2,000 lbs. per hour from its new 8 inch diameter 30:1 L/D extruder, reducing the plant capacity severely. Several well recognized extrusion experts including the extruder vendor's chief engineer attacked the problem by modifying the extrusion conditions and changing to other screw designs, all without much success. The plant was facing a loss of several million dollars per year unless the problem could be solved.

Although some people considered further inspections of the old plant to be a waste of time, it was discovered that the old plant was making larger size beads. Furthermore, the old plant provided better mixing of a processing aid used at only 50 ppm in the extruder feed stock. Once these differences were discovered, it only took about two weeks to learn to make larger beads at the new plant. This change, in combination with better mixing of the processing aid, more than doubled the output of the extruder immediately and eventually led to even higher outputs. The problem was solved.

As another example, the procedure for addition of slip agents to polyethylene being extruded can greatly affect the extruder output.

For large diameter extruders it is easy to lose over 50% of the output if the procedure for slip addition results in coating the barrel feed section solids conveying zone with the slip agent. In one case extruding 100,000 lbs. of slip-free polyethylene was not adequate to restore the output. However, immediately after a boiling hot solvent treatment of the barrel feed section, normal output was restored.

Although extruder and screw design are most often the limiting factors in achieving good extrusion processing, this is not always the case.

- George A. Kruder

See also:

- [Defining screw performance](#)
- [Ten key principles of extrusion](#)
- [The importance of periodic audits of extrusion performance](#)

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